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Traditional and Modern Agriculture Mosaic System for Improving Resilience to Global Change

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Asia is home to a number of traditional agricultural landscapes that have withstood climate variability and varied societal changes for over thousand years. Their sustainability is due to high degree of resilience that is brought about by integrated resource management, maintenance of material cycles, supporting a variety of societal and ecosystems services, etc. However, the productivity of such systems is not high enough to meet today's needs. On the other hand modern agricultural systems are highly productive and efficient but are vulnerable to changes in climate and markets due to their optimized nature. The UNU-ISP project CECAR Asia focuses on enhancing sustainability of rural agriculture production systems by combining the resilience of traditional agricultural systems with the efficiency of the modern systems. The study covers, Indonesia, Sri Lanka and Viet Nam, with ancient irrigation systems and Kandyan home gardens selected for study in Sri Lanka.

The study on enhancing resilience and productivity of irrigation systems is composed of three components namely, (1) Groundwater in Northern Province Irrigation: Investigation of ground water potential for irrigation needs for a diversified crop calendar and the options for ground water recharge, (2) Use of short term rainfall forecasts: Incorporating short-term rainfall forecasts for irrigation supply decision making in Mahaweli H using bulk water allocation system, and (3) Mosaic of Traditional and Modern Irrigation Systems: Water allocation and water distribution mechanism study in the Deduru Oya system to identify optimal water allocation among traditional and modern systems and type of farmer organizations for managing in water distribution.

Satellite images show that existing irrigation tanks having a strong influence on soil moisture and vegetation in the surrounding area. The groundwater recharging may be used to enhance storage and use in diversifying agriculture practices. Currently downscaled numerical weather predictions at 4 km scale shows a clear over estimation of rainfall forecasts compared to ground observations. Bias correction and/or statistical approaches are required to improve the forecasts. Deduru Oya LB canal system has been selected for the study of Mosaic System. LB canal will feed existing traditional tanks in addition to expanding the irrigated areas. Both water allocation (using HEC-HMS for inflows and WEPA for water allocation) and water distribution (house hold survey to understand farmer perception in traditional tank areas and newly opening areas) aspects have been studied. Preliminary studies show that new reservoir can supply average irrigation needs, but the existing tanks would be useful in dry years,

Keywords: Ground water, mosaic systems, traditional and modern, weather forecast

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